

WHAT IS CLAIMED IS:

1.) A polymer system comprising:

A.) an anionic polymer selected from the group consisting of

(i) anionic polymers comprising;

a.) a first moiety derived from monoethylenically unsaturated C₃-C₈ monomers comprising at least one carboxylic acid group, salts of such monomers, and mixtures thereof; and

b.) a second moiety selected from the group consisting of:

(1) moieties derived from modified unsaturated monomers

having the formulae R – Y – L and R – Z wherein:

i.) R is selected from the group consisting of

C(X)H=C(R¹)- wherein R¹ is H, or C₁-C₄ alkyl; and X is H, CO₂H, or CO₂R₂ wherein R₂ is hydrogen, alkali metals, alkaline earth metals, ammonium and amine bases, saturated C₁-C₂₀ alkyl, C₆-C₁₂ aryl, and C₇-C₂₀ alkylaryl;ii.) Y is selected from the group consisting of –CH₂-, -CO₂-, -OCO-, and –CON(R^a)-, -CH₂OCO-; wherein R^a is H or C₁-C₄ alkyl;

iii.) L is selected from the group consisting of hydrogen,

alkali metals, alkaline earth metals, ammonium and amine bases, saturated C₁-C₂₀ alkyl, C₆-C₁₂ aryl, and C₇-C₂₀ alkylaryl; andiv.) Z is selected from the group consisting of C₆-C₁₂ aryl and C₇-C₁₂ arylalkyl; and

(2) moieties having the formula J–G–D wherein:

i.) J is selected from the group consisting of

C(X)H=C(R₁)- wherein R₁ is H, or C₁-C₄ alkyl; X is H, CO₂H, or CO₂R₂ wherein R₂ is hydrogen, alkali metals, alkaline earth metals, ammonium and amine bases, saturated C₂-C₂₀ alkyl, C₆-C₁₂ aryl, C₇-C₂₀ alkylaryl;

ii.) G is selected from the group consisting of C₁-C₄ alkyl, -O-, -CH₂O-, -CO₂-.

iii.) D is selected from the group consisting of

-CH₂CH(OH)CH₂O(R³O)_dR⁴;
 -CH₂CH[O(R³O)_dR⁴]CH₂OH;
 -CH₂CH(OH)CH₂NR⁵(R³O)_dR⁴;
 -CH₂CH[NR⁵(R³O)_dR⁴]CH₂OH, and mixtures thereof; wherein

R³ is selected from the group consisting of ethylene, 1,2-propylene, 1,3-propylene, 1,2-butylene, 1,4-butylene, and mixtures thereof;

R⁴ is a capping unit selected from the group consisting of H, C₁-C₄ alkyl, C₆-C₁₂ aryl and C₇-C₂₀ alkylaryl;

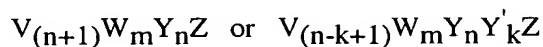
R⁵ is selected from the group consisting of H, C₁-C₄ alkyl C₆-C₁₂ aryl and C₇-C₂₀ alkylaryl; and subscript index d is an integer from 1 to 100.

(ii) graft co-polymers comprising a first moiety derived from monoethylenically unsaturated C₃-C₈ monomers comprising at least one carboxylic acid group, salts of such monomers, and mixtures thereof, said first moieties being grafted onto a C₁-C₄ carbon polyalkylene oxide,

and mixtures thereof; and

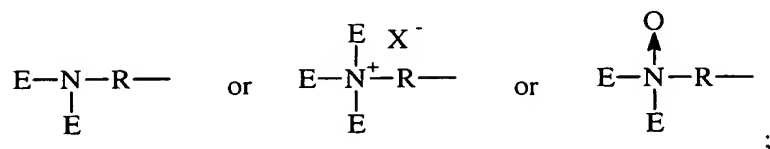
B.) a modified polyamine polymer selected from the group consisting of

(i) modified polyamines having the formulae

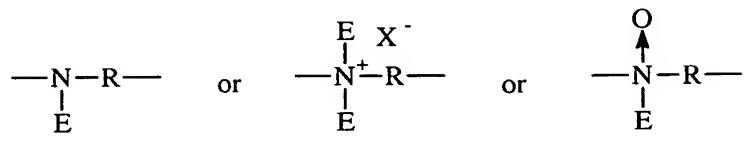


wherein m is an integer from 0 to about 400; n is an integer from 0 to about 400; k is less than or equal to n wherein

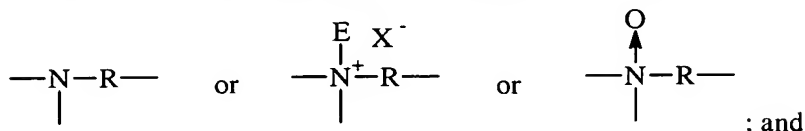
a.) V units are terminal units having the formula:



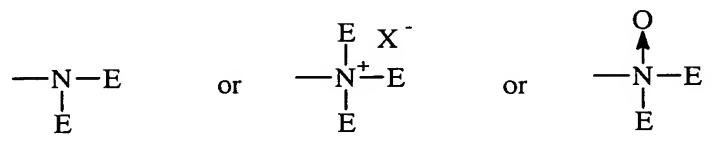
b.) W units are backbone units having the formula:



c.) Y and Y' units are branching units having the formula:



d.) Z units are terminal units having the formula:



wherein:

R units are selected from the group consisting of C₂-C₁₂ alkylene, C₄-C₁₂ alkenylene, C₃-C₁₂ hydroxyalkylene, C₄-C₁₂ dihydroxy-alkylene, C₈-C₁₂ dialkylarylene, -(R¹O)_xR¹-, -(R¹O)_xR⁵(OR¹)_x-, -(CH₂CH(OR²)CH₂O)_z-(R¹O)_yR¹(OCH₂CH(OR²)CH₂)_w-, -C(O)(R⁴)_rC(O)-, -CH₂CH(OR²)CH₂-, and mixtures thereof; wherein

R¹ is C₂-C₃ alkylene and mixtures thereof;

R² is hydrogen, -(R¹O)_xB, and mixtures thereof;

wherein at least one B is selected from the group consisting of -(CH₂)_q-SO₃M, -(CH₂)_pCO₂M, -(CH₂)_q(CHSO₃M)CH₂SO₃M, -(CH₂)_q-(CHSO₂M)CH₂SO₃M, -(CH₂)_pPO₃M, -PO₃M, and mixtures thereof, and any remaining B moieties are selected from the group consisting of hydrogen, C₁-C₆ alkyl, -(CH₂)_q-SO₃M, -(CH₂)_pCO₂M, -(CH₂)_q(CHSO₃M)CH₂SO₃M, -(CH₂)_q-(CHSO₂M)CH₂SO₃M, -(CH₂)_pPO₃M, -PO₃M, and mixtures thereof;

R⁴ is C₁-C₁₂ alkylene, C₄-C₁₂ alkenylene, C₈-C₁₂ arylalkylene, C₆-C₁₀ arylene, and mixtures thereof;

R⁵ is C₁-C₁₂ alkylene, C₃-C₁₂ hydroxy-alkylene, C₄-C₁₂ dihydroxyalkylene, C₈-C₁₂ dialkylarylene, -C(O)-, -C(O)NHR⁶NHC(O)-, -R¹(OR¹)-, -C(O)(R⁴)_rC(O)-, -

$\text{CH}_2\text{CH}(\text{OH})\text{CH}_2-$, $-\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{O}(\text{R}^1\text{O})_y\text{R}^1-$

$\text{OCH}_2\text{CH}(\text{OH})\text{CH}_2-$, and mixtures thereof;

R^6 is C_2 - C_{12} alkylene or C_6 - C_{12} arylene;

X is a water soluble anion; provided at least one backbone nitrogen is quaternized or oxidized

E units are selected from the group consisting of hydrogen, C_1 - C_{22} alkyl, C_3 - C_{22} alkenyl, C_7 - C_{22} arylalkyl, C_2 - C_{22} hydroxyalkyl, $-(\text{CH}_2)_p\text{CO}_2\text{M}$, $-(\text{CH}_2)_q\text{SO}_3\text{M}$, $-\text{CH}(\text{CH}_2\text{CO}_2\text{M})-\text{CO}_2\text{M}$, $-(\text{CH}_2)_p\text{PO}_3\text{M}$, $-(\text{R}^1\text{O})_xB$, $-\text{C}(\text{O})\text{R}^3$, and mixtures thereof; provided that when any E unit of a nitrogen is a hydrogen, said nitrogen is not also an N-oxide;

R^1 is C_2 - C_3 alkylene and mixtures thereof;

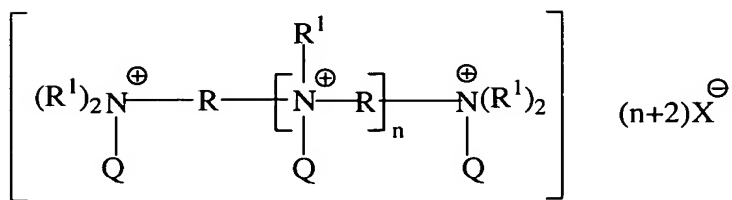
R^3 is C_1 - C_{18} alkyl, C_7 - C_{12} arylalkyl, C_7 - C_{12} alkyl substituted aryl, C_6 - C_{12} aryl, and mixtures thereof;

at least one B is selected from the group consisting of $-(\text{CH}_2)_q\text{SO}_3\text{M}$, $-(\text{CH}_2)_p\text{CO}_2\text{M}$, $-(\text{CH}_2)_q(\text{CHSO}_3\text{M})\text{CH}_2\text{SO}_3\text{M}$, $-(\text{CH}_2)_q(\text{CHSO}_2\text{M})\text{CH}_2\text{SO}_3\text{M}$, $-(\text{CH}_2)_p\text{PO}_3\text{M}$, $-\text{PO}_3\text{M}$, and mixtures thereof, and any remaining B moieties are selected from the group consisting of hydrogen, C_1 - C_6 alkyl, $-(\text{CH}_2)_q\text{SO}_3\text{M}$, $-(\text{CH}_2)_p\text{CO}_2\text{M}$, $-(\text{CH}_2)_q(\text{CHSO}_3\text{M})\text{CH}_2\text{SO}_3\text{M}$, $-(\text{CH}_2)_q(\text{CHSO}_2\text{M})\text{CH}_2\text{SO}_3\text{M}$, $-(\text{CH}_2)_p\text{PO}_3\text{M}$, $-\text{PO}_3\text{M}$, and mixtures thereof;

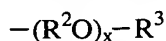
M is hydrogen or a water soluble cation in sufficient amount to satisfy charge balance; and

wherein the values for the following indices are as follows: subscript index p is an integer from 1 to 6; subscript index q is an integer from 0 to 6; subscript index r has the value of 0 or 1; subscript index w has the value 0 or 1; subscript index x is an integer from 1 to 100; subscript index y is an integer from 0 to 100; and subscript index z has the value 0 or 1.

(ii) modified polyamines having formula (I):



- a.) R is C₆-C₂₀ linear or branched alkylene, and mixtures thereof;
- b.) X is an anion present in sufficient amount to provide electronic neutrality;
- c.) n and subscript index n have equal values and are integers from 0 to 4;
- d.) R¹ is a capped polyalkyleneoxy unit having formula:

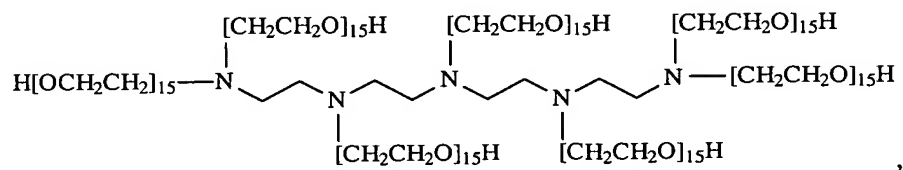


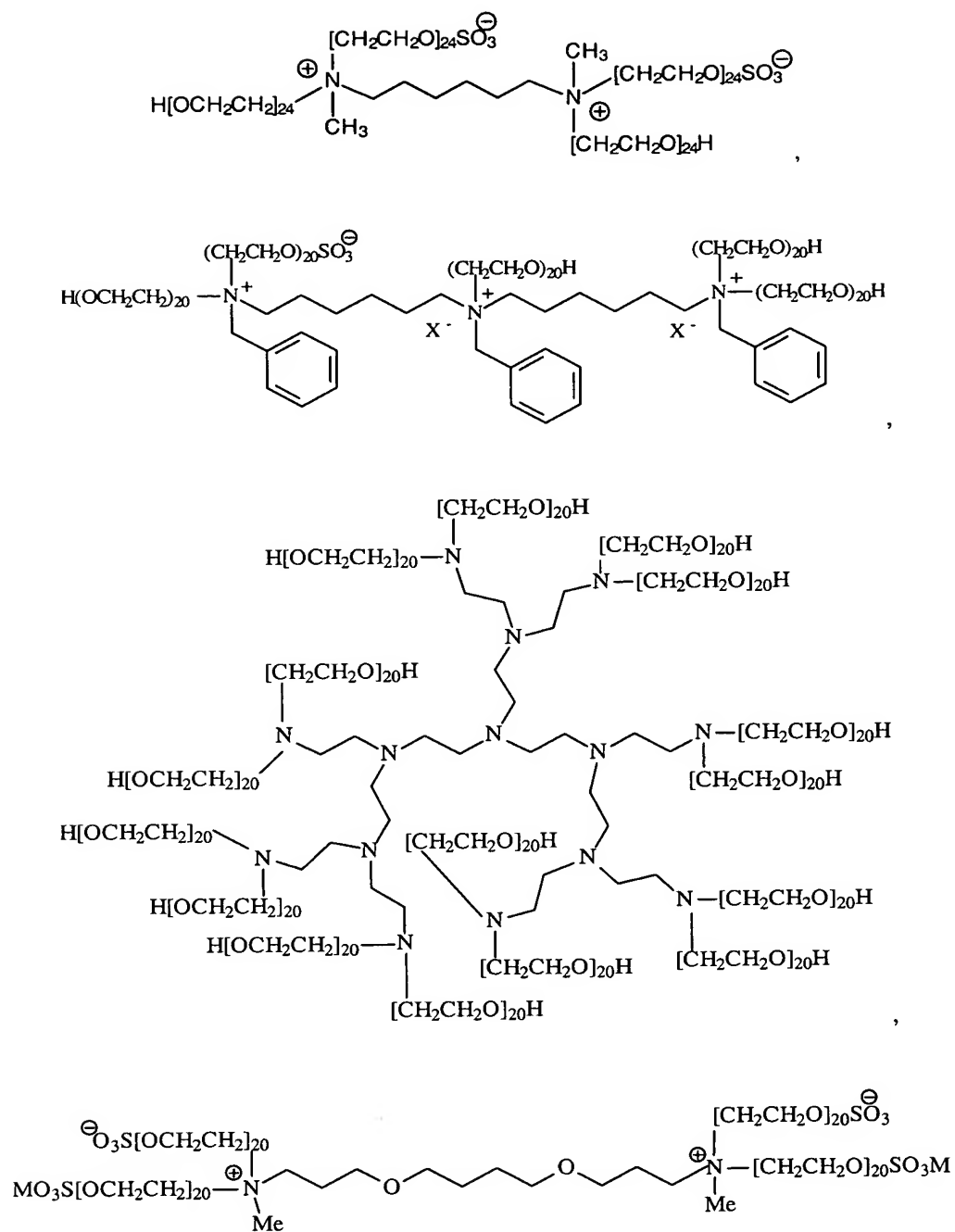
wherein R² is C₂-C₄ linear or branched alkylene, and mixtures thereof; subscript index x has a value from about 1 to about 50; at least one R³ moiety is an anionic capping unit, with the remaining R³ moieties being selected from the group comprising hydrogen, C₁-C₂₂ alkylenearyl, an anionic capping unit, a neutral capping unit, and mixtures thereof;

- e.) at least one Q moiety, is a hydrophobic quaternizing unit selected from the group comprising C₇-C₃₀ substituted or unsubstituted alkylenearyl, and mixtures thereof, any remaining Q moieties are selected from the group comprising lone pairs of electrons on the unreacted nitrogens, hydrogen, C₁-C₃₀ substituted or unsubstituted linear or branched alkyl, or C₃-C₃₀ substituted or unsubstituted cycloalkyl, and mixtures thereof;

and mixtures thereof.

- 2.) The polymer system of Claim 1 wherein said modified polyamine polymer is selected from the group consisting of polymers having the following formulae:





and mixtures thereof.

3.) A cleaning composition comprising the polymer system of Claim 1

4.) A method of cleaning a situs comprising contacting said situs, or a soiled portion thereof, with the cleaning composition of Claim 3 or a diluted solution comprising the cleaning composition of Claim 3 and then optionally washing, followed by optionally rinsing said situs.